WHAT IS CLAIMED IS:

1.   A method for encoding a program guide, the method comprising:

encoding a first set of slices for each of a plurality of graphics pages; and

encoding a second set of slices for each of a plurality of video streams.

2.   The method of claim 1, where the first set of slices are intra-coded.

3.   The method of claim 2, where the second set of slices are intra-coded.

4.   The method of claim 3, further comprising:.

encoding a third set of slices for each of the plurality of video streams, where the third set of slices are predictive-coded.

5.   The method of claim 4, further comprising:.

encoding a fourth set of slices for each of the plurality of video streams, where the fourth set of slices comprise skipped-coded graphics.

6.   The method of claim 3, where encoding the second set of slices is performed once per group of pictures (GOP) for each of the plurality of video streams.

7.   The method of claim 4, where encoding the third set of slices is performed multiple times per group of pictures (GOP) for each of the plurality of video streams.

8.   The method of claim 5, where encoding the fourth set of slices is performed multiple times per group of pictures (GOP) for each of the plurality of video streams.

9.   The method of claim 1, further comprising:.

encoding a plurality of audio streams, each audio stream having a corresponding video stream.

10.   The method of claim 5, further comprising:.

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2 forming a packet stream by multiplexing together first, second,
3 third, and fourth sets of packets, where the first set of packets include the first set of
4 slices, the second set of packets include the second set of slices, the third set of packets
5 include the third set of slices, and the fourth set of packets include the fourth set of slices.

1 11.   The method of claim 10, further comprising:.
2   encoding a plurality of audio streams, each audio stream having a
3 corresponding video stream;
4   forming an audio packet stream by multiplexing together the
5 plurality of audio streams; and
6   forming a transport stream by multiplexing together the packet
7 stream and the audio packet stream.

1 12.   A bitstream for representing a program guide, the bitstream
2 comprising:
3   a first set of packets including a set of slices for each of a plurality
4 of graphics pages; and
5   a second set of packets including a set of slices for each of a
6 plurality of video streams.

1 13.   The bitstream of claim 12, where the first set of packets are
2 identifiable by a first set of packet identifiers.

1 14.   The bitstream of claim 13, where the second set of packets are
2 identifiable by a second set of packet identifiers.

1 15.   The bitstream of claim 14, where the first set of packets comprise a
2 set of intra-coded slices for each of the plurality of graphics pages.

1 16.   The bitstream of claim 15, where the second set of packets
2 comprise a set of intra-coded slices for each of the plurality of video streams.

1 17.   The bitstream of claim 16, where the second set of packets further
2 include a second set of slices for each of a plurality of video streams, where the second
3 set of slices are predictive-coded.

18. The bitstream of claim 17, where the second set of packets further include a third set of slices for each of a plurality of video streams, where the third set of slices are skipped-coded.

19. The bitstream of claim 12, further comprising:.

a third set of packets including a plurality of audio streams, each audio stream having a corresponding video stream.

20. The bitstream of claim 12 including multiple full motion video streams which can be retrieved directly with a demultiplexer and decoder from a single tuner at a receiving terminal.

21. The bitstream of claim 12 including multiple full motion video streams which can be played interchangeably from a single tuner.

22. The bitstream of claim 12 including multiple full motion video streams which can be retrieved directly with a demultiplexer and decoder without being accessible to a microprocessor.

23. A method of generating a user interface to be transmitted in a packet stream to terminal units, the method comprising:

creating a first set of packets by encoding a set of slices for each of a plurality of graphics; and

creating a second set of packets by encoding a set of slices for each of a plurality of video streams.

PICTURE-IN-PICTURE AND MULTIPLE VIDEO STREAMS USING SLICE-BASED ENCODING

ABSTRACT OF THE DISCLOSURE

Methods for slice-based encoding of program guides and user interfaces. The

5   program guides include multiple video streams for picture-in-picture and other applications. A method for encoding the program guide includes encoding a first set of slices for each of a plurality of graphics pages; and encoding a second set of slices for each of a plurality of video streams.

The user interfaces are multi-functional and may be used for electronic commerce and

10   other applications. A method of generating the user interface includes encoding a set of slices for each of a plurality of objects, each object being characterized by an identity, at least one attribute, and at least one operation. In one embodiment of this method, the plurality of objects include an electronic commerce object, where the electronic commerce object is attributed with a first hyper text markup language (HTML) page.

15   A head-end centric system and apparatus for encoding and delivery of realtime and non-realtime content, including: a non-realtime content source for providing non-realtime content; a non-realtime encoder for encoding the non-realtime content into encoded non-realtime content; a realtime content source for providing realtime video and audio content; a realtime encoder for encoding the realtime video and audio content into encoded realtime video and audio; a remultiplexer for repacketizing the encoded non-realtime content and the

20   encoded realtime video and audio into transport packets; and a re-timestamp unit coupled to the remultiplexer for providing timestamps to be applied to the transport packets in order to synchronize the realtime and non-realtime content therein.

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